



LOCKS & KEYS



Issue 16

The Newsletter for lock collectors

November 2001

Secrets from the vault

In 1969 I was working in the headquarters of a government department. The building was a modern office block near Whitehall, originally built as a commercial office block. My duties also took me to another building nearby, built as a bureaucratic headquarters in the late nineteenth

century. Many of its offices on upper floors were equipped with safes.

Possibly they were original equipment - I cannot now remember them in detail from fleeting glimpses, though I think they were Hobbs safes. Many had been encased in masonry, probably in the 1930's, to give some reinforcement. None I saw can have been post-war. All I saw had keylocks.

Despite being quite junior, I was aware there was a 'flap' on in the department - but a 'quiet flap', i.e. a very discreet one as civil service flaps go. Officials who needed more modern security had modern safes. The British government had had some unfortunate experiences in the 1930's and 1940's. Unlike most commercial customers, in the '50's Government had embraced the combination lock wholeheartedly. My boss, who had few secrets, had a keysafe with a combination lock.

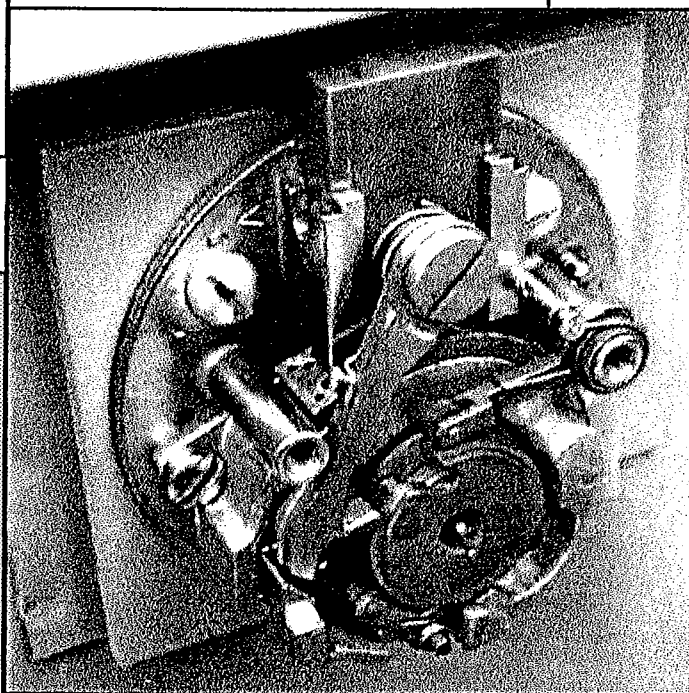
Not an asset to any army

In 1953 Sergeant Robert Johnson, part-time crooked gambler, black-marketeer, drunkard, and pimp, went to KGB (Soviet State Intelligence) HQ in Berlin to offer to defect from the US Army. He did not seem to be an asset to any army, and was dissuaded

continued on p.3

"Locks & Keys" needs more subscribers. If you know any other collectors, please ask them to subscribe to their own copies!

"Locks & Keys" welcomes contributions, preferably with un-coloured illustrations on separate sheets. Unfortunately, colour photographs tend to be too dark to reproduce well. PC disks with files in Word7, Works4.5, Write, Wordpad, or saved as .rtf can be used. Please send an sae if you need a reply



This Chubb Manifoil lock was issued in 1967, fitted (in upside down position) to a steel box. It has lead plate protection against Xray attack. It was never used, and was disposed of as government surplus recently.

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Small world / Help needed

This year I was able to visit the Newark Antiques Fair, the largest antique fair in Britain. Just inside the entrance a large padlock caught my eye. I saw someone also looking at this. It was Trevor Dowson from Sheffield.

More surprisingly, Jon Millington from Britain encountered Peter von Knorre from Germany in a street market in China!

The number of collectors of locks is small, but there are more than you might think. People are buying locks and keys in shops, and on the Internet. Clearly some of the sellers know little about what they offer for sale. There have been exaggerated claims of rarity and age. There are also some fakes. Pirate goods have been around since the beginning of brand names. Some are almost genuine, in being offered by a sub-contractor directly, instead of by the owner of the brand name — who receives no profit. Bramah and Chubb both suffered from this in their early years.

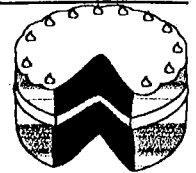
Other pirates are cheap imitations trading on a reputable name: both trade name owner and customer suffer, though the price usually undercuts the genuine article. In some cases, names, marks, appearance, or packaging imitate a brand more or less closely. This can amount to the offence of 'passing off'. There are, for example, numerous products such as Vale, Kale, Other products are marked in ways which suggest neither maker nor customer really understands the writing, but both are, presumably, impressed — even by mis-spellings, anachronisms, and improbabilities. 19th century Indian locks are a common source of these; there is, for example, a padlock marked 40lever!

There are also some modern fakes designed to fleece unwary collectors — and the price is not cheap! Some are creations with no genuine existence, though claiming to be genuine rarities. Others are copies of valuable rarities but misrepresented. There are also replicas originally sold honestly, such as cast-iron mechanical banks. But after some years, and a few owners, some 'distressing' and the loss of, or grinding down of, the part stamped TAIWAN, these can appear genuine.

Even if the seller is not clear about what is being offered, be sure you know what you are buying for your money!

Several enquiries come to me repeatedly. Two of the most common are for booklists of *available* useful books on locks and keys, mainly for medieval period onwards. And suggestions on how to clean/conservate old locks and keys. These often come from new collectors or someone curious about just one item. Will you experts help me produce leaflets on these subjects?

Goodies ...



There are various items which those interested in locks and keys might also like. Browsing through old and new catalogues for example, there are various keyrings, some novelties that you really can't do without!

Some make a noise when you whistle — useful when you lose them. Bracelets with padlocks on (a few with actual keys) have been an old favourite.

For the handcuff collector in your life, there were in the Argos catalogue various cufflinks and tiepins. They seem to have been dropped from the current catalogue, but others are still available from Hiatts of Birmingham, or in the USA, Thomson-Hiatts.

Several years ago, I saw a lock collector with a smart multi-tool in a small case on his belt. The original multi-tool (apart from US Civil War carbines with coffee grinders in their butts) was the Swiss army knife.

The arrival of Mr Leatherman's multi-purpose tool, including pliers, knife, and screwdrivers, prompted the appearance on the market of numerous imitations. Many, though not all, are, like the original, in stainless steel. The original model was expensive; there followed a smaller version. Now there are imitations and Leatherman tools at a wide price range.

Some find them useful. Personally, I find a set of screwdriver bits with a ratchet handle of more use.



A Christmas pop-up postcard

- No statement on the future of the Lock
- Museum, Willenhall, has been recieved for
- publication.

from defecting. However, the Soviets were not the people to turn down an offer to spy, and Johnson was recruited. As a spy, he was not impressive. He supplied an American map showing where Soviet forces in Germany were based. ("We know where our own forces are, thank you.")

Johnson resigned from the army in 1956. He intended to make his fortune gambling in Las Vegas and being a famous author. Having failed in both fantasies, by January 1957 he was broke. At Soviet prompting, he attempted to re-enlist. Not surprisingly, the USAF rejected him, but the Army, unaware of his previous activities, took him back. He obtained a posting to Nato Headquarters in Europe. From there, he was posted in 1961 to guard duty at a US outpost at Orly Airport.

The Armed Forces Courier Center

It was a squat, square concrete building isolated inside a barbed wire compound sited near the perimeter, well away from the terminal buildings of Orly Airport, Paris. Armed couriers came several times a week from Washington with leather cases handcuffed to their wrists. Other armed couriers came and went almost daily, and sometimes at night, travelling between Orly and elsewhere in Europe. Through the Armed Forces Courier Center flowed the secrets of the fundamental strengths and weaknesses of Nato and the USA, their cipher systems, and perhaps most valuable of all, keying schedules to Nato and US cipher machines.

Impenetrable vault

The KGB had had its eyes on the Center from the time it was built, soon after Nato was founded in 1949. It was impenetrable. The only outside door opened into a small office, with a rest room. The vault itself had an outer grille gate with two combination padlocks, Sargent & Greenleaf 8088 type. This was the very latest high security combination padlock, introduced in 1951. The main door had a key lock, about which nothing is known publicly. Only officers could hold a key or combination. No one officer held all three keys, or could enter alone, and an officer had to be present whenever the door was open. 24 hours a day, 365 days a year, there was an armed guard on duty. Now the KGB had

an agent in place - but it was Sgt Robert Johnson, who had seemed such unpromising spy material seven years before!

Late in 1961, Johnson became one of the clerks in the office. He always carried a tin of modelling clay, supplied by the KGB, which had knowledge of the CIA key-casting kit. One day when the officer with the door key became ill, Johnson made an impression of it. Such was his haste, though, that the key the KGB made did not fit. Later, Johnson found a spare key inside the vault, apparently forgotten. He removed it overnight and carefully made three impressions. Three weeks later his KGB contact handed him a shining key, which did fit.

"One down and two to go."

Johnson was reprimanded for trying to overlook an officer dialling a combination padlock. In June 1962, the combinations were routinely changed. A captain who had been on leave telephoned to ask what his new combination would be. The duty officer made a calculation on a slip of paper, and gave the captain numbers which, added to his old combination, gave the new. Johnson later retrieved the paper with all the numbers on it, from the trashcan.

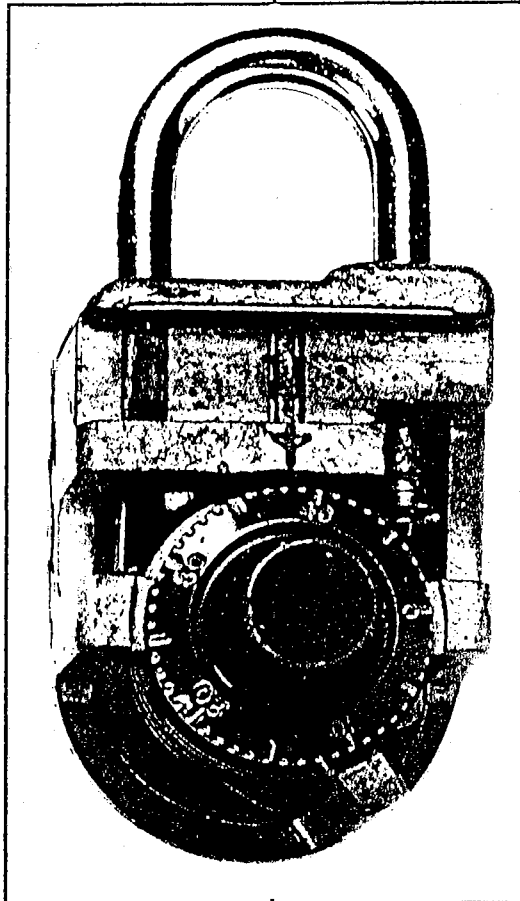
"Two down and one to go."

The KGB invested a massive effort into the operation to penetrate the vault. Their scientists created a device to obtain the combination of the padlocks. No example is in captivity in the West, so we only have Johnson's description of it.

It was a flat circular metal plate about 4" in diameter containing a piece of film, which fitted behind the lock, and a cone about 9" long which fitted over the lock. It contained a tiny amount of radioactive material, and a clockwork driven shutter to allow it to X-ray the lock. It took 30 minutes to expose the film. After Johnson used this device, the KGB gave him the third combination.

Immediately after translation, the documents were rushed to Khrushchev

Johnson first entered the vault in December 1962. The take caused a sensation in Moscow, and the documents were shown to President Khrushchev immediately after translation. Some of them were classified above Top



Cut-away Sargent & Greenleaf padlock used for secret agent training

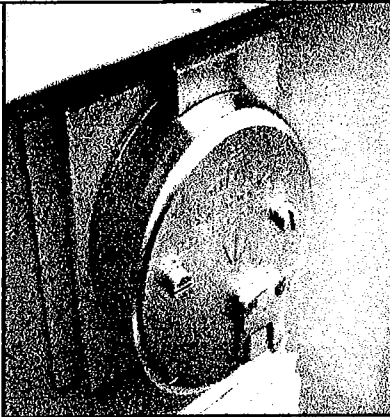
Secret. They disclosed numbers and locations of US nuclear warheads in Europe, the overall Nato plan for the defence of Europe and much of its detail. Perhaps most valuable, were the cipher machine key settings, enabling the Soviets to read masses of enciphered US and Nato radio

and radioteletype traffic as soon as it was transmitted.

Wars have been won with less intelligence. Had the Soviet Union started a war against Nato in 1963, she would have won. And the Soviet Union was the only country planning to start a war in Europe. (Nato planned and exercised only in defence as a reaction to Soviet attack.) Up to April, there were seven penetrations, producing material of enormous value. There was a close call then, when a guard on the next shift arrived early, and the KGB decided to wait until the end of summer brought long dark nights again. But before then, Johnson was transferred. In May 1964 he was transferred again, to the Pentagon; soon he might himself become a courier.

Nosenko defects

At the end of 1964, Yuri Nosenko, a middle-rank KGB officer, defected. For some time, he was not trusted, but he did expose Sgt Johnson. Interrogating and trying Johnson took some time. When it became clear that the FBI knew enough to convict Johnson, and that he faced the death penalty, he offered to become a double agent. The FBI probably regarded him with the same disbelief (and contempt) as the KGB had earlier received his offer to defect. He only began to reveal details of his activities after conviction, and his account was long, rambling and garbled. For long, he persisted in



Cover of Chubb Manifoil comlock

saying only that the Soviets supplied the keys he used. Eventually he also described his part in obtaining the key and combinations, and described the X-ray device. Johnson was murdered in prison in 1972.

MI5 scientific research

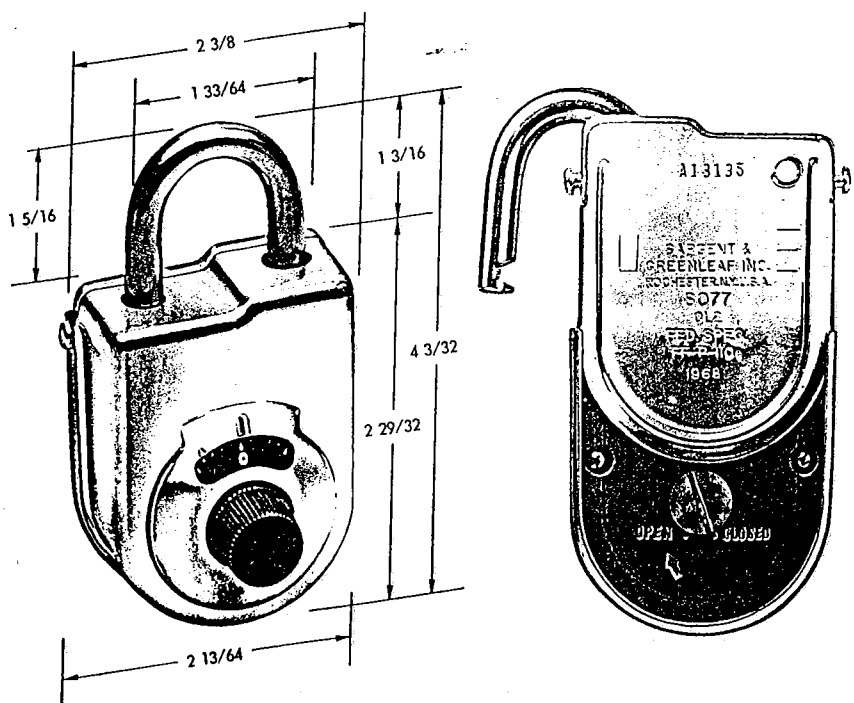
During and after the Second World War, MI5 and MI6 (which did not officially exist) trained many agents in burglary techniques. MI5 could pick locks, including many safe locks, and manipulate combination locks. In the mid-50's, however, the arrival of manipulation-proof combination locks defeated MI5, (and presumably MI6 also, but as it did not exist, no-one has yet admitted what it could or could not do). After decades of hostility and rivalry, the two services began to co-operate in 1955. MI5 started a programme of scientific research. As its capacity to conduct research (and its funding) was limited, projects had to be undertaken one at a

8077 TYPE DE (exposed shackle)

This padlock is designed to resist attack by the following techniques:

1. 30 man minutes against manipulation attack
2. 30 man minutes against radiographic attack
3. 10 man minutes against surreptitious attack

The S & G 1951 combination padlock, currently identified as the 8088, has over the years been respected as the best available high security combination padlock manufactured. Despite the fine quality of the 8088 and its predecessors, there can be no question that the 8065 and 8077 by contrast make available far greater resistance to the many modern techniques of attack. We are confident that all persons responsible for physical security will want to replace all existing padlocks with the objective in mind of providing for the calibrated minimum security required under the federal specification FF-P-110.



time. The last project was to overcome safe locks. Success was achieved at the Atomic Energy Research Establishment, Aldermaston, using X-rays. This was probably about 1961. (Probably this work also informed the development of portable bomb disposal equipment.) Just after this, changes occurred in MI5 organisation, which limited the use made of this ability to open any safe in Britain!

X-ray-proof locks

X-ray-proof combination locks were launched to the public in 1971. News that the Soviets had also developed a method to crack combination locks using X-rays persuaded the US Central Intelligence Agency and MI5 to reveal a certain vulnerability to some reliable suppliers of equipment used in strategic industries. All Whitesafes were vulnerable to X-ray attack, and had to be assessed as to whether it was worth fitting protection. It had to be done discreetly. However, in May 1971, when the programme to upgrade government safes was well advanced (and consuming production of X-ray-proof locks as fast as they were being made), the news leaked out.

Government sources told investigative journalists that X-raying had been used by 'industrial spies' in the USA. The truth was too embarrassing to admit to the public on either side of the Atlantic! (The popular line in the West was that the Soviet Union was technologically backward.)

Not all newspapers acted 'responsibly', some choosing instead to publish something a little different from the official line.



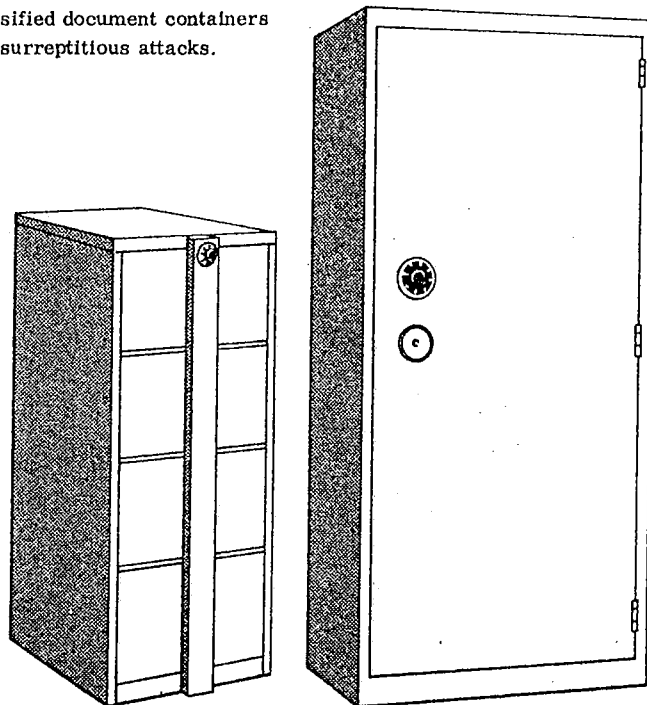
RONEO VICKERS SECURITY CABINETS

INDUSTRIAL ESPIONAGE ? Are your secrets really secret ?

To be completely secure, classified document containers must be designed to withstand surreptitious attacks.

Office Furniture is not security equipment, and is extremely vulnerable to

- lock picking
- lock manipulation
- lock drilling
- Radiograph (X-Ray) attack
- Exposed hingepins attack
- Removal of top or sides
- etc.
- etc.



VICKERS SECURITY CABINETS RESIST ALL ATTACKS

The Roneo Vickers range is custom made to exacting Government specifications, with a built-in resistance to the highly sophisticated techniques that are known to be used by espionage agents.

Two types of lock can be fitted, either the CHATWOOD MILNER 3 wheel combination lock, or CHUBB 5 lever lock with a "detector" lever that records any attempt at picking. Both locks are proof against the use of X-Ray equipment.

For full details of specification, prices, and delivery consult:-

DIVERSIFIED CORPORATE SERVICES LIMITED,
Orchard House,
14 Great Smith Street,
LONDON SW1P 3BU.

telephone: 01-222-1434/5/6

Small portable industrial X-ray equipment later became available, intended for examining castings and welds. Little use seems to have been made by common criminals of such equipment. Today the method is rarely mentioned, but is in the arsenals of technologically advanced State agencies. It prompted development of locks designed to be opaque, or almost completely

transparent, to X-rays.

Locks continue to be an important aspect of security, even national security. Their failure can have serious consequences. However, Britain's MOD has some classified locks which it is difficult for spies to learn about.

Richard Phillips

Questions from readers

Write in to "Locks & Keys" with your questions about locks. Somebody will surely be able to supply answers. The Editor will be pleased to print a composite answer to questions. When replying, please mention the number of the question. [Answers appear on p. 8]

23] This padlock, of iron black japanned or painted, is marked **J M & S Pat 4643**.

It appears to be for a double-bitted key, but a single-bitted key operates. The key shown is not original, but happens to fit. The lock has 2 drill-pins, one in the middle being obvious. The key enters at the right keyhole, fitting on a shorter pin, and can be removed when unlocked. The shackle is spring-loaded and self-locking. Can anyone give any information about it? It was acquired in the USA, but appears to be British.

Jeffrey A Strumberger
one6india@milwpc.com

Regulating the private security industry in Scotland

The Scottish Executive is now consulting on legislation proposals to regulate the security industry and its personnel by licence.

Undoubtedly there will be a cost to this legislation. It will include all sectors of the industry, such as locksmithing. This could affect even amateur collectors — many of whom engage in locksmithing activities.

Licensing authorities would charge fees to recover their costs.

Representations may be made by 14 December 2001 to:

Darren Burgess, Scottish Executive Justice Department Room E1-2, Saughton House, Broomhouse Drive, Edinburgh EH11 3XD United Kingdom

On show

Next year, *Ingo Schmoeckel* will have an exhibition of his lock collection in the "Veste Coburg" castle in Bavaria. Ingo's padlocks will be on display during February — April next year, as part of the tour of the castle. The town is anyway a tourist attraction, so for those readers able to do so, it would be well worth a visit.

In the meantime, for those who bought, or have yet to buy, Ingo's booklet, the corrected English translation is now available.

Vorhängeschlösser: sammlung Ingo Schmoeckel (Padlocks: Ingo Schmoeckel collection), Oberursel im Taunus, 2000. Available from Ingo Schmoeckel Herzog-Adolf-Str. 9 D 61440 Oberursel, Germany; price £10 / \$25 (please send banknotes). Many illustrations some coloured; text in German, with an English translation to accompany the booklet for non-German customers. There was an article on the booklet in issue #14 p.2.



Workshop practice books

The series of books listed on p.10 is now published by Nexus Special Interest Books.

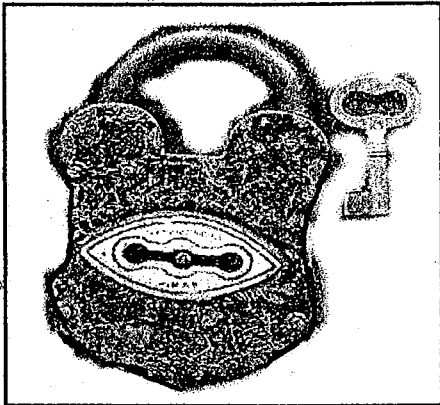
They were formerly published by Model & Allied Press (MAP). They have a long history of publishing practical books for the beginner, hobbyist and modelmaker. As such these books do not generally require a very well equipped workshop, or they show how to make necessary tools and equipment. Most are pre-metric, though some have been revised and metricated.

They are available by mail order from:
The Outdoorsman's Bookstore
22-24 High Street
HORLEY

Surrey RH6 7BB United Kingdom

☎01239 77249 fax01293 431286
sales@outdoorsman.co.uk

Many other other books, including some from Paladin Press, are available.



“Locks, safes and security”

TOBIAS, Marc Weber

LOCKS, SAFES, AND SECURITY: An International Police Reference. 2nd Ed., 1440 pp. (6 3/4 x 9 3/4), 569 il. ISBN 0 398 07079 2 \$199.95, cloth.

This new second edition, many years in the making, provides the reader with the information that is needed to understand both traditional mechanisms as well as the most modern and sophisticated security technology incorporated into locks and how to bypass them. The author presents extremely detailed theoretical and practical information in order to facilitate a thorough understanding of the complex subject matter.

While the first edition covered many topics in summary fashion, this revised work examines each facet of the subject in extensive and, when required, intricate detail. Law enforcement, forensic examiners, the intelligence community, security management personnel, locksmiths, architects, security specialists, special operations personnel, lawyers, and others need to have this critical information presented in this book in order to deal effectively with their missions and be able to assess vulnerability through a solid theoretical understanding of the subjects covered. Information in this book has been gathered from many sources, including locksmiths, manufacturers, instructors from recognized specialized entry schools, vendors, lock suppliers, designers, engineers, inventors, forensic examiners, and others. The subject of this book is very complicated, diverse, and global. There is a great deal of history and technology incorporated within the modern lock, container, and security system. The focus of this text is to put all of this information into an understandable and useable format.



Marc Weber Tobias originally wrote *Locks safes and security* (LC71 135947) in 1970. With 331 pages the history was a bit thin for collectors, but the then current detail is useful and now also part of history. The new edition does not greatly duplicate the earlier, so they are complimentary. There is too much in these books to review - they have to be read. The technical information on locks is not always as detailed as might be desired, but still a valuable resource to anyone interested in locks. One feature of the second edition is the advice on the forensic examination of locks and keys, and safes.

At 10p per page, I thoroughly recommend it, and suggest having the first edition also.

The first edition of this book was one of the original references about locks used by forensic laboratories and law enforcement agencies throughout the world.

The revised textbook contains forty chapters, with over 1400 pages of detailed information about locks and safes: their construction, design, and bypass, as well as an in-depth analysis of physical security. There are over 550 illustrations, photographs, and diagrams to supplement the text, in extraordinary detail. The book may be ordered directly from the publisher.

You may preview the text on-line by key word search, or through its comprehensive index. An electronic

infobase edition, LSS+ CD-ROM will be released fourth quarter, 2001, and will provide expanded text and graphics, and updates to the hardbound edition. The author has also re-written two famous treatises on locks and safes, originally published by Alfred C. Hobbs, and George Price, during the 1850s. In addition, the famous manual “*The Art of Manipulation*” has been edited and included within LSS+.

LOCKS, SAFES, and SECURITY provides the first in-depth treatise on the subject since 1856 when George Price wrote his

famous treatise in England. This book has been written specifically for criminologists, investigators, security specialists, and government agencies involved in covert operations. The book contains forty chapters that examine the subjects of locks, safes, and security in detail. The theory of each locking mechanism is presented, as well as the latest bypass tools and techniques for locks and safes.

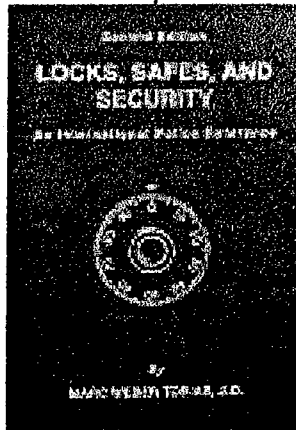
Foreword by Dr. Ilya Zeldes, Director, South Dakota Forensic Laboratory (retired)

Foreword by Special Agent Brockman C. Self, FBI (retired)

THE AUTHOR has been involved in the analysis and bypass of locks for the past thirty years, and has consulted with many government agencies and private corporations regarding bypass and security of locks. He is an investigative attorney who conducts technical fraud investigations and related cases. Marc Weber Tobias received his Bachelor’s Degree with a major in law enforcement, and a Juris Doctor Degree in law. He has written five police textbooks and has been granted several U.S. and foreign patents involving the bypass of locks. During his career, he has worked both in the government and private sectors, involved in conducting and directing civil and criminal investigations.

<http://www.security.org/dial-0/lss.htm>

Information from CC Thomas and Richard Hopkins



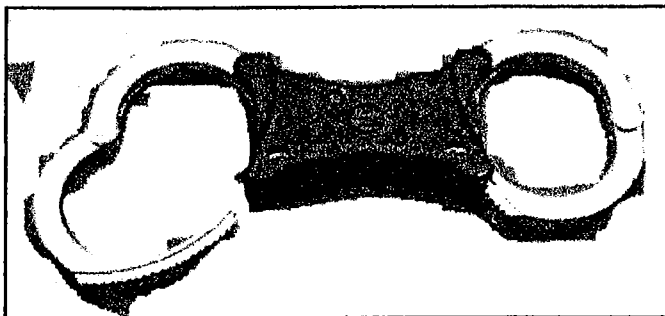
For Sale

Hiatt Speedcuffs

These are one of Hiatt's current Peerless-type cuffs, as used by many British police forces - £25 (inc. post). The SPEEDCUFF is a purpose designed package comprising an integral rigid steel handcuff and an ergonomic plastic grip. (GB registered design No. 2034362). Using pressure sensitive areas, it can be a significant aid to gaining control. Speedcuff includes the following:

- New, improved, 3 independently floating locking bars, with 6 teeth each bar. -- Provides extra locking positions with perimeter sizes the widest in the industry.
- 25 locking positions
- Perimeter, minimum 5 3/4" 146mm maximum 9 1/4" 235mm
- Shackles can be backloaded for speedcuffing (an exclusive Hiatt feature).
- 400gm 14oz
- Heavy duty rivets.
- Fast, smooth, positive swing through action.
- Exceed all published test standards.

Speedcuff is THE British arrest handcuff. (NB Hiatt do not supply this product to North America.) Hiatt also supply various pouches for this model, and a handcuffing training manual.



Also a number of Indian screwkey padlocks for trade.
Trevor Dowson 17 Landseer Dr Gleadless Valley
Sheffield Yorkshire S14 1BS UK



Magee's Annual Padlock Auction

Too late to bid for 300+ locks etc (closing date before this newsletter appears) but remember to ask for details in late summer next year.

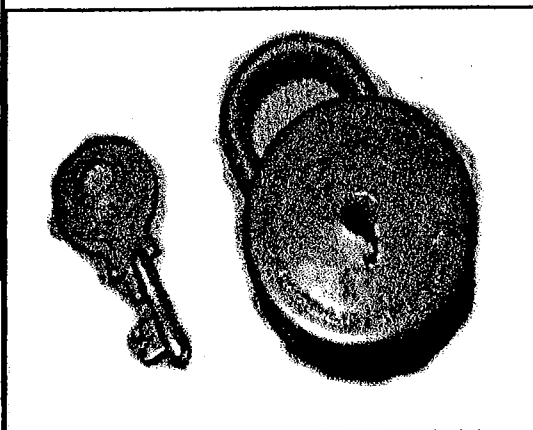
Complete illustrated catalog, with prices realised, available for \$10 from:
Bill Magee 1364 Jeffco Blvd, Arnold, MO
63010 USA;
email bkmagee@aol.com

Answers from readers

Write in to "Locks & Keys" with your questions about locks. Somebody will surely be able to supply answers. The Editor will be pleased to print a composite answer to questions. When replying, please mention the number of the question.



21] I have a key twice the size of the one shown in #15 p.6 (i.e. actually the same size as the illustration.) This key has an oval bow marked 'H Pooley & Son Patent Liverpool'. A very similar key appears in 1950's Gibbons' catalogues, for for various window locks. The round bow is typical of Gibbons keys, so this might indeed be a Gibbons window lock key. Their window locks were supplied mainly to institutional customers, such as mental hospitals and prisons.

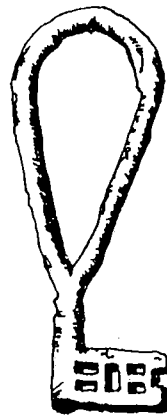
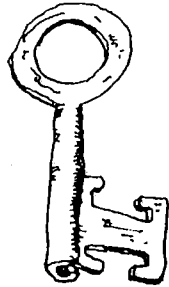
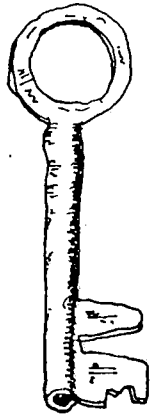
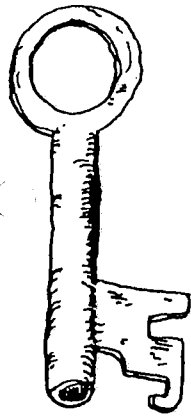


A Pinson and Parkes et al puzzle ...

Another Pinson version of this padlock has come to light. Same size, 32mm, same decoration and markings, but this one uses a round key. The key appears to have been made by folding and pressing a flat sheet stamping. There might, therefore, be other versions out there, from the other makers (Josiah Parkes, Anglo-American Lock Company, Walsall Lock & Cart Gear).

See the article in issue #11 p.5

Medieval
7th. - 15th. Centuries



Bronze

Bronze

Bronze

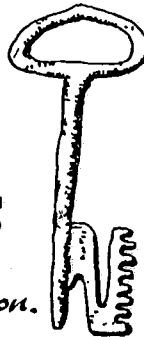
Bronze

Usual method was wrought iron.
Less common - "rolled" from sheet iron. "Bits" cut with chisel.

8th. - 11th. Centuries

"Pipe" Keys to fit over pin within lock.

11th. - 13th. C.



Lozenge Bow Common in 14th. C.

Iron.

Iron.

"Toothing" of fore-end of "bit" became popular in 13th. C. and more elaborate in 14th. C.

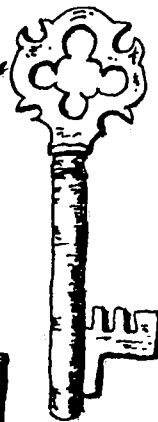
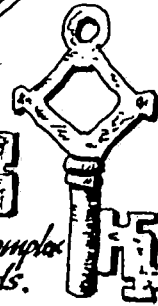
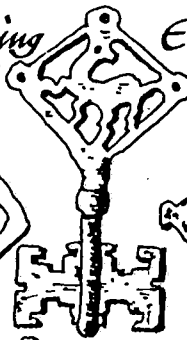
The most common shape of the 15th. C. - the "Kidney Bow"

Iron 15th. C.

Bronze was the most widely used metal for keys in the early part of this period,

replaced by iron in 13th. & 14th. C.

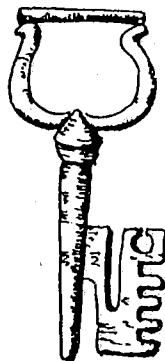
Increasing Elaboration of Bows.



More Complex Wards.

14th. - 15th. C. - Iron.

"Spiked" Stem - typical of Norman Keys. 11th. C.



15th. C. Iron.

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A complete work on the construction methods used, this book contains the details for building the floor assembly, walls and roof and covers the peripheral areas including layout, planning regulations, tools, materials, cost savings, ideas, drainage, power supply lighting, heating, lifting out, security and insurance.

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25. The Backyard Foundry

B TERRY ASPIN

This book covers basic principles, materials and techniques, pattern-making, moulding boxes, cores and core boxes, metals, electric, gas and coke furnaces. Step-by-step procedures are also included with examples of locomotive cylinders and wheels. Although written primarily for the model engineer, anyone wishing to make mouldings or castings will profit from its pages.

1997 1-85486-146-8
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104 pages Illustrated paperback
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26. Home Workshop Hints & Tips

EDITED BY VIC SMEED

A selection of useful hints and tips culled from a wide time-scale of the Model Engineer magazine as relevant today as when they were first printed.

includes many helpful nuggets of knowledge which have appeared in brief notes or articles, often many years ago, and never republished until now. This book will interest and instruct anyone who works with metal.

1997 1-85486-145-X
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27. Spindles

HARRITT SANDHU

Spindles describes the design construction and use of a variety of spindles that will be of interest to the amateur engineer. Milling, grinding and drilling spindles are covered along with a unique light gear cutting frame for clockmakers. The emphasis is not on heavy duty industrial grade spindles but rather on spindles that are easy to make and have as few parts as possible.

1997 1-85486-149-2
210x148mm
160 pages Illustrated paperback
£6.95

28. Simple Workshop Devices

TUBAL CAIN

Tubal Cain, who has enjoyed more than 60 years experience in designing and building engines and machines (in both full size and model) shares his experiences of making these ancillary devices.

This is an updated edition of a previously published title, now introduced into the Workshop Practice Series, and is an essential addition to any model engineer's library.

1998 1-85486-150-6
210x148mm
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NEW 29. CAD for Model Engineers

D.A.G. BROWN

Derek Brown shows how by taking one step at a time the computer can soon be turned into a versatile drawing tool with many advantages over traditional drawing methods. In this book he seeks to strip away the mystique surrounding CAD by avoiding jargon and provides advice on how to choose and progress with the right system.

1999 1-85486-189-1
210x148mm
128 pages Illustrated paperback
£6.95

NEW 30. Workshop Materials

ALEX WEISS

This book describes the many and varied materials used by model engineers in their workshops such as ferrous and non-ferrous metals, hard and soft woods and a number of engineering and non-engineering plastics. It also contains details of abrasives, adhesives, bearing materials, ceramic and refractory materials, castings, electroplating solutions, fuels, gases, lubricants, pickles, polishing materials, sealants and solders.

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192 pages Illustrated paperback
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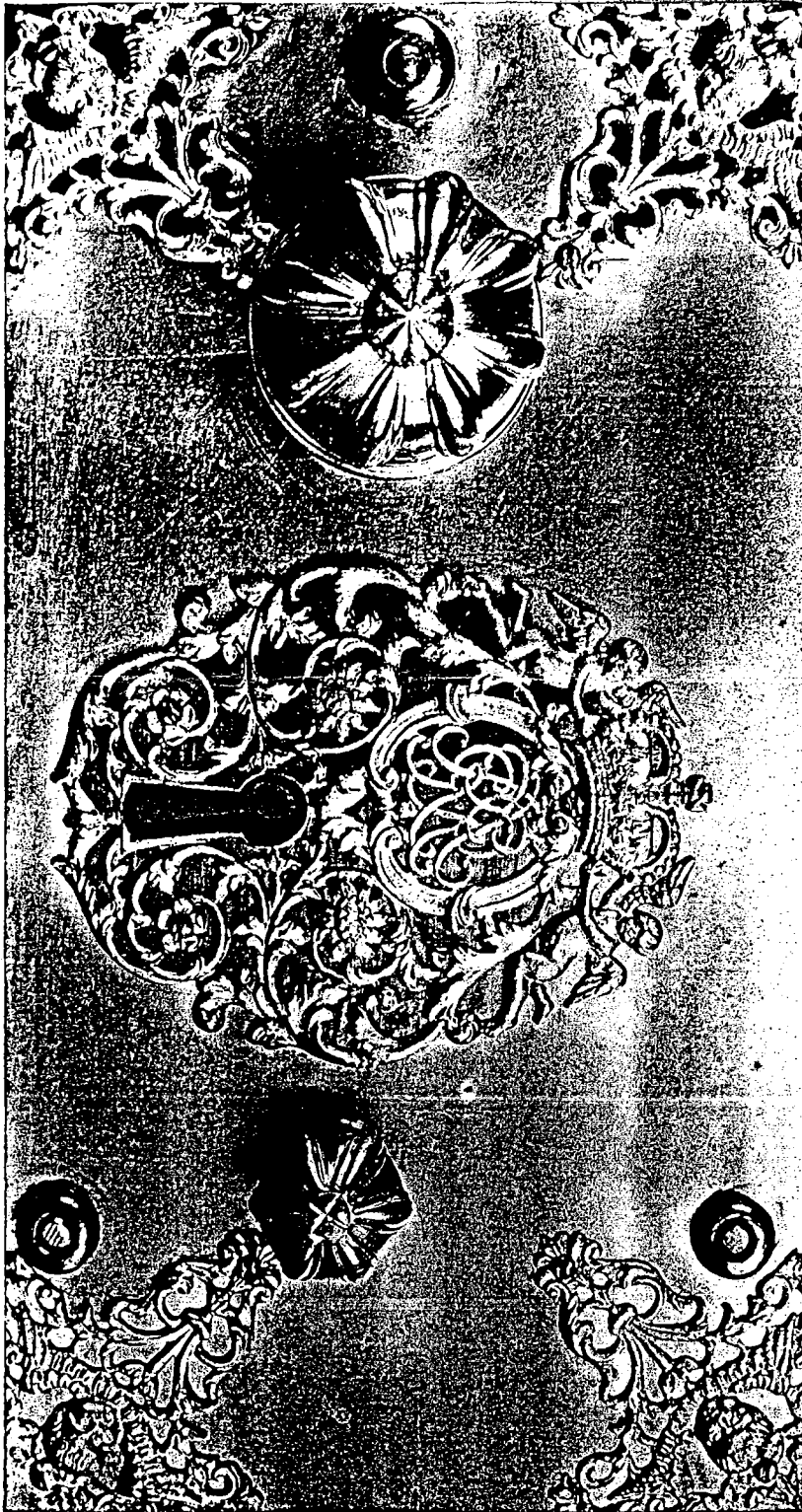
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BR8 8HU

Plain reproduction of a wartime poster. This is probably, though not certainly, from the First World War. Whenever, the key looks curiously unfamiliar and atypical! In this form, the poster was provided for hand colouring. (Any comments on the key depicted would be welcome to the Editor.)



GILT BRASS DOOR-LOCK FROM HAMPTON COURT PALACE.



**Put into protective
custody during the
Great War**

This beautiful lock was given to the Victoria and Albert Museum in 1916. It was possibly designed by Sir Christopher Wren (1632-1723). It belongs to a door of one of the Hampton Court Palace State Rooms designed by Wren.